

Name: _____

**Final Exam Study Guide
Algebra 1A**

***We will be completing this study guide in parts. If you know how to complete all problems on this Study Guide AND complete additional suggested items, you will do very well on the Final Exam.**

***If you choose to skip a night of studying and practice, you probably will not do as well as you would like!**

***Remember that you should also practice ADDITIONAL problems offered, actively PARTICIPATE in all classroom REVIEW, and attend TUTORIAL!**

***Twenty minutes per night starting TONIGHT!**

***Please answer all written responses in at least TWO complete sentences using at least TWO algebraic terms.**

Part One: Expressions and Order of Operations

1. Algebraic Writing: Answer each question in complete sentences using algebraic terms. Be sure to echo the prompt.

a. Name one similarity and one difference between an expression and an equation. Be sure that the similarity and the difference each relate to algebra.

b. Between multiplication and division, how do you decide which operation should be performed first in an expression?

c. What is a function? Can you give an example?

2. Define the following and give examples:

Rational numbers

Integers

Whole numbers

Irrational numbers

3. Translating Equations and Expressions. List all keywords for the following operations	
Addition	Subtraction
Multiplication	Division
Equals	Variable

4. Writing Algebraic Expressions and Equations: Write an algebraic expression or equation for each.
a. twice a number z increased by two
b. Eight less than the product of negative nine and a number.
c. The quotient of fifteen and a number is three.

5. Evaluating Expressions	
What does it mean to evaluate an expression?	
Evaluate each expression if $x = 2$, $y = 4$ and $z = 3$.	
a. xyz	b. $2y - x + z$
c. $3(y - z + x)$	D. $(y \div x + 3) - z$

6. Order of Operations: Show all work and box your final answers.

a. $6 - 1 + 7$

b. $\frac{2(5) + 8 - 3}{11 - 6}$

c. $20 - [2(6 + 3) - 10] + 1$

d. $4 + 5(3) - 6 + 11$

e. $2 \times 8 - 5 + 20 \div 5$

f. $2[4(9 - 7) + 1] - 10 + 4$

7. What is order of operations? What do you do if you have both addition and subtraction?

8. Integer Operations:

a. A negative number plus a negative number is _____

b. How do I know the sign if I add a negative and positive number? Give an example in your explanation.

c. The product of two negative numbers is _____.

d. The product of a negative and a positive is _____.

9. Integer operations: Answer the following (may not use calculator)

a. $2 - 5 =$

b. $2 + (-5) =$

c. $-2 - 5 =$

d. $-2 - (-5) =$

e. $2(5) =$

f. $(-2)(-5) =$

g. $(-2)(5) =$

h. $2(-5) =$

i. $10/(-2) =$

10. Integer Word Problem: A diver is thirty-five feet below the surface of the water. He swims even further down for another fifty-two feet. What is his depth, with respect to the surface of the water? Write your answer as an integer and explain how you arrived at your answer.

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Part Two: Simplifying Expressions and geometry

<p>11. Give an example of two like terms and explain HOW they are like terms.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>12. What two operations does the distributive property combine in this example? Explain. Example: $-12(3 + 7)$</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>13. Are the terms $12a^2b$ and $16ab^2$ like terms? Explain your reasoning.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

14. Define the following and give examples	
$3x^2 + 4x - 7 + 3x - 2x^2 - 8$	
Terms	Coefficient
Constant	Like terms

Simplifying Expressions: Simplify each expression as completely as possible. BOX your final answers.

15. $5 - 4 + 8 - 7$

16. $6(5x + 1)$

17. $-(x - 5)$

18. $-11(2w + 3)$

19. $4(2y + 2) + 7y$

20. $6x + 4x$

21. $6x - 4x$

22. $-6x - 4x$

23. $-6x - (-4x)$

24. $6(w - 3) - w + 1$

25. $a + b + a + b + a + b$

26. $-10y - 9 + 3y - 11$

27. Matching: Please write the CAPITAL LETTER of the expression that matches each phrase.

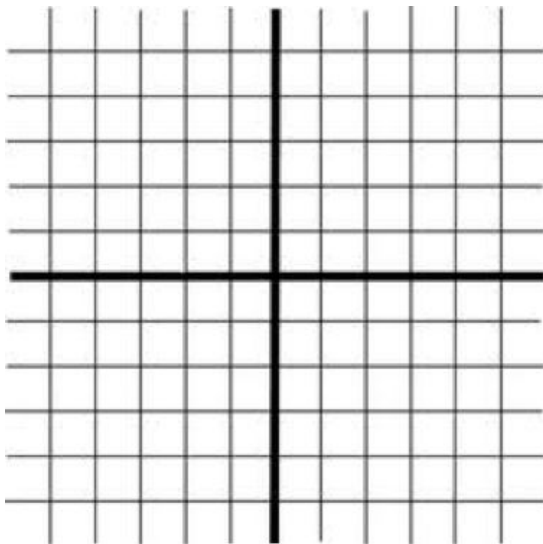
- A. $4y$ B. $4 + y$ C. $4(2 + y)$ D. $4 - y$ E. $y - 4$
 F. $2(4 + y)$ G. $4 + 2y$ H. $4/y$ I. $2(y - 4)$ J. $2y - 4$

- _____ the sum of four and twice y
 _____ the quotient of four and y
 _____ four decreased by y
 _____ four less than y
 _____ the product of four and y
 _____ two times the difference of y and four
 _____ the sum of four and y
 _____ four multiplied by the quantity of two plus y
 _____ twice y subtracted by four
 _____ two multiplied by the sum of four and y

28. Distance Formula

Plot the following points on the coordinate plane.

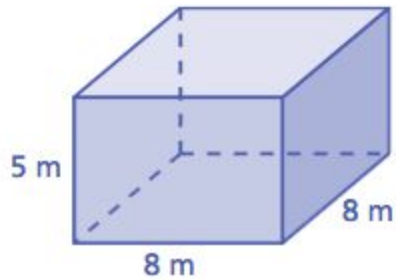
A (-5, -1) B (3, 2)



Calculate the **distance** from (5, -1) to (3,2)

Label	Formula
Substitute	Answer

29. Geometry

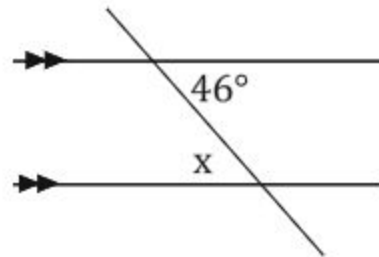
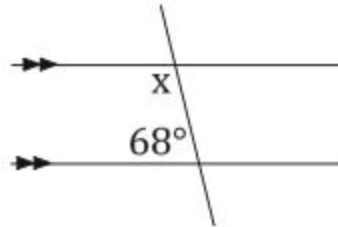


Find Surface Area and Volume

$$V = l(w)(h)$$

SA = add up all area sides

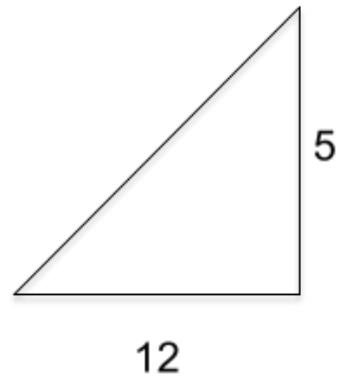
Solve for the missing angles.



30. Pythagorean Theorem

Explain the pythagorean theorem.

Find the length of the missing side.



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Part Three: Probability, Statistics, and Properties of numbers

31. Six-Sided Die: Calculate the following probabilities if you are rolling a six-sided number die. Reduce all fractions.

a. $P(3)$	b. $P(\text{odd})$	c. $P(\text{not } 1)$
d. $P(1, 2, 3)$	e. $P(\text{odd, odd, odd})$	d. $P(1, 5, 7)$

32. Compound Probability without Replacement: You are picking out your clothes for the week. Once you wear a shirt, you will not wear the shirt again that week. Suppose you have **three red shirts, four blue shirts, one white shirt, and two green shirts.**

a. What is the probability that you will randomly wear a white shirt, then a blue shirt?

b. What is the probability of wearing an orange shirt?

c. What is the probability that you will wear a blue shirt four days in a row?

33. Mean, Median, Mode - Answer the questions below

Nate was doing a “Biggest Loser” weight loss competition at work. For him to win the competition his weight average for the week needs to be less than 205 lbs. If he weighed the following amounts, what would his final weigh-in have to be?

210, 206, 204, 204, 207

34. Complete the chart below for the data and make a double box and whisker plot.

Wizards Points: 105, 92, 101, 121, 116, 119, 111

Celtics Points: : 115, 91, 123, 102, 89, 129, 123

	Unit 7	Unit 8
Minimum		
Lower Quartile		
Median		
Upper Quartile		
Maximum		

Box-and-Whisker Plot

35. SRS: What has to be true for a sample to accurately represent a population?

36. Give examples of each property.	
Inverse property of multiplication	Inverse property of addition
Commutative Property of multiplication	Commutative property of addition
Associative Property of multiplication	Associative Property of addition
Multiplication property of zero	Addition property of zero
Identity property of addition	Identity property of multiplication
Distributive Property	Symmetric Property

37. Matching Properties: Write the CAPITAL LETTER of the property that each example illustrates.	
Property Word Bank: A. Inverse Property of Multiplication B. Inverse Property of Addition C. Commutative Property of Addition D. Associative Property of Addition E. Multiplication Property of Zero F. Distributive Property	
i. $5(0) = 0$ _____	ii. $5(\frac{1}{5}) = 1$ _____
iii. $6 + (-6) = 0$ _____	iv. $5(2 + 3) = 5(2) + 5(3)$ _____
v. $1 + (2 + 3) = 1 + (3 + 2)$ _____	vi. $4 + (2 + 3) = (4 + 2) + 3$ _____

38. Answer the questions below.
i. _____ This property states that "If $a = b$, then $b = a$."
ii. _____ Which property is illustrated by the equation: $a(bc) = (ab)c$?
iii. _____ Which equation illustrates the Identity Property of Addition?
A. $7 + 0 = 7$ B. $7 + (-7) = 0$ C. $7 - 7 = 0$ D. $7 + 8 = 8 + 7$

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Part Four: Equations and Inequalities

39. Equations: Solve each equation. Show all work and box your final answer.

a. $3a = -12$

b. $b + 7 = -15$

c. $4(c - 2) = 16$

d. $12 + \frac{d}{-3} = 10$

e. $12e + 5 - 8e = 25$

f. $10(2f + 1) - 8f = 12f + 1$

g. $5g + 2 + 7g = 6(2g + 1) - 4$

h. $\frac{1}{5}h = -40$

40. What is the major goal of solving an equation?

41. What are some common properties of numbers used in solving equations?



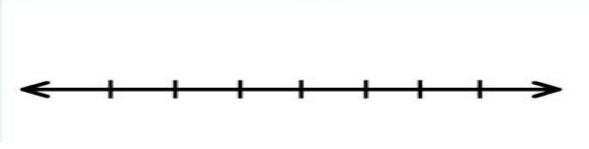
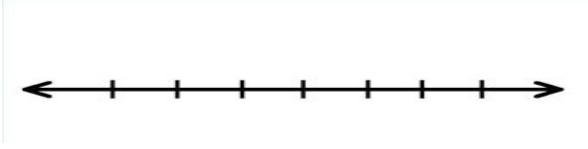
42. Justifying Steps while Solving an Equation: Justify each step of the equation with an algebraic property.

Steps	Justifications
$-5(2x + 1) = 15$	Given
$-10x - 5 = 15$	
$-10x = 20$	
$x = -2$	

43. Justifying Steps while Solving an Equation: Justify each step of the equation with an algebraic property.

Steps	Justifications
$35 = 3x + 4 + 2x + 6$	Given
$35 = 3x + 2x + 4 + 6$	
$35 = 5x + 10$	
$25 = 5x$	
$5 = x$	
$x = 5$	

44. Solving Inequalities: Solve and graph each inequality on the number line.

<p>a. $a + 8 < -2$</p> 	<p>b. $-6b \geq 18$</p> 
<p>c. $-10 < c + 5 \geq -8$</p> 	<p>c. $d < -1$ OR $d \geq 2$</p> 

45. Percentages - Tax, Tip, Discount	
<p>Sara went shopping at H&M. She bought two shirts and some pants that when full price cost \$65, but luckily all items were 25% off. She is excited about the discount, but also realizes that she will still have to pay a 5.25% sales tax rate on the items.</p>	
<p>How much will she save with a 25% discount?</p>	<p>How much would she have to pay with a 25% discount before taxes?</p>
<p>What would the sale's tax be for her discounted purchase?</p>	<p>What would her total bill cost?</p>

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Part Five: Percent Change/Interest/DRT

46. Percent Change: Calculate the percent change for each situation. Round to the nearest hundredth, if necessary.

$$\frac{\text{New} - \text{Original}}{\text{Original}} \times 100$$

a. A tree branch is fifteen feet long. After a storm, it breaks and is only three feet long.

b. Chris deposits \$400 in his bank account. Two months later, he has \$450 in his bank account.

47. Simple Interest: Please answer each question. Round to the nearest cent, if necessary.

$$I = prt$$

$$\text{Total} = I + p$$

a. Mr. Frog deposits \$30,400 into a bank account that gives 3% simple annual interest. How much interest will he earn after four years?

b. Mr. Toad purchases an umbrella for \$20 on a credit card that charges 15% simple monthly interest. What is the TOTAL AMOUNT he will owe after three months if he makes no payments?

48. What are the four types of DRT problems and what are the general equations for each?

49. DRT Problem. Elise left for the day, but she forgot her cell phone. She is riding in a car that is driving an average of 45 mph. Anthony, seeing her cell phone, hops on his motorcycle an hour later to bring her the cell phone. If he is driving at an average of 55 mph, after how many hours will he catch up to Elise?

a. What type of DRT Problem is this?

b. Write the GENERAL equation for this type of problem.

c. Define a variable.

d. Fill in the DRT Table below.

	rate	time	Distance

e. Using the GENERAL equation from part b and your table, WRITE an equation for the situation.

f. Solve the equation.

ANSWER THE QUESTION:

50. DRT Problem. Megan and Jorge are both at school, preparing to leave for summer vacation. Megan leaves at 3 pm, traveling north at a speed of 60 mph, to her cabin in Maine. Jorge leaves at 4 pm, traveling south at a speed of 50 mph, to his beach house in Florida. At what time will Megan and Jorge be 600 miles apart?

a. What type of DRT Problem is this?

b. Write the GENERAL equation for this type of problem.

c. Define a variable.

d. Fill in the DRT Table below.

	rate	time	Distance

e. Using the GENERAL equation from part b and your table, WRITE an equation for the situation.

f. Solve the equation.

ANSWER THE QUESTION:

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Part Six: Proportions and Function Rule

51. Proportion: BOX your final answer.

$$\frac{9}{6} = \frac{x}{10}$$

$$\frac{4}{m-8} = \frac{8}{2}$$

The ratio of the weight of Meg's cat to the weight of Anne's cat is 5:7. Meg's cat weighs 20 kg. How much more does Anne's cat weigh?

The scale of a map is 1 inch : 20 miles. What is the actual distance between two towns that are 3.5 inches apart?

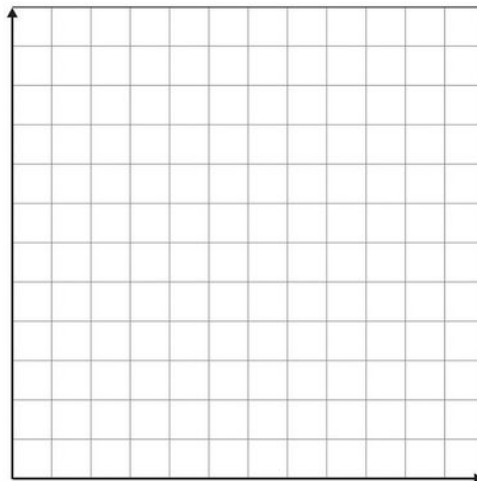
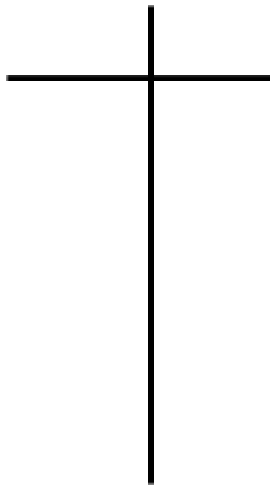
52. Function Rule A cell phone plan costs \$10 a month for unlimited data plus \$0.25 per text message. Write a linear model that represents the monthly cost of this cell phone plan.

Write a function rule to describe this relationship.

Let ____ = _____ Let ____ = _____

Equation: _____

Model the function with a table of values and a graph. (2 points)



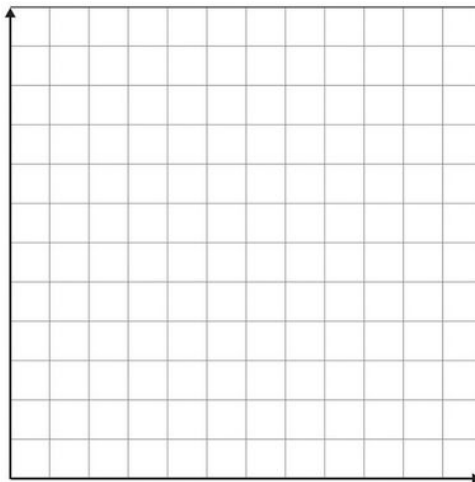
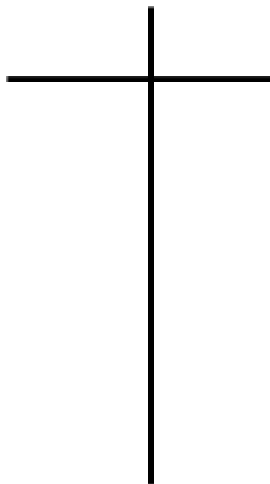
53. Function Rule Zeke sleeps six hours last night plus two hours per nap. Write a function rule showing how many hours he sleeps.

Write a function rule to describe this relationship.

Let ____ = _____ Let ____ = _____

Equation: _____

Model the function with a table of values and a graph. (2 points)



54. Direct and Inverse Variation: Determine whether the table is direct or inverse variation.

Then write the equation for each table.

x	y
3.5	2
1	7
-1	-7

x	y
-15	3
30	-6
-5	1

direct variation **OR** inverse variation

direct variation **OR** inverse variation

equation:

equation:

y varies directly with x. If $y = -4$ when $x = 2$, find y when $x = 9$.

y varies inversely with x. If $y = 40$ when $x = 8$, find x when $y = 10$.